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IS 12239-2 (1999): Tractors and Machinery for Agriculture and Forestry - Technical Means for Ensuring Safety, Part 2: Tractors [FAD 11: Agricultural Tractors and Power Tillers]

“ज्ञान से एक नये भारत का निर्माण”

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“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

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“Knowledge is such a treasure which cannot be stolen”



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भारतीय मानक

कृषि एवं वानिकी के लिए ट्रैक्टर एवं मशीनें —

सुरक्षा सुनिश्चित करने के तकनीकी साधन

भाग 2 ट्रैक्टर्स

(पहला पुनरीक्षण)

Indian Standard

TRACTORS AND MACHINERY FOR AGRICULTURE
AND FORESTRY — TECHNICAL MEANS FOR
ENSURING SAFETY

PART 2 TRACTORS

(*First Revision*)

ICS 65.060.10; 65.060.01

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Agricultural Tractors and Power Tillers Sectional Committee had been approved by the Food and Agriculture Division Council.

With the increased use of agricultural tractors and power tillers for various agricultural operations, the need of human safety has attained importance. This standard indicates appropriate safety parameters to be met when designing tractors.

This standard has been published in three parts. This part (Part 2) covers requirements related to agricultural tractors. Part 1 of the standard covers general requirements and Part 3 relates to power tillers.

This standard was first published in 1988. This first revision is based on the following ISO standards:

ISO 4252 : 1992 Agricultural tractors — Operators work place, access and exit — Dimensions

ISO 4254-3 : 1992 Tractors and machinery for agriculture and forestry — Technical means for ensuring safety — Part 3 : Tractors.

This standard is technically equivalent to ISO 4252. As tractors with three point linkage at front are not being manufactured in India, requirements of front three point linkage of ISO 4252-3 has not been incorporated in this Indian Standard.

Requirements of guards, operators controls and lighting of earlier version has been retained and certain norms that should be observed during the operation of tractors are also given in Annex A for guidance.

Requirements given in 4.3.1 to 4.3.3 of this standard are applicable only for tractors with cabs.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2:1960 'Rules for rounding off numerical values (revised)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

TRACTORS AND MACHINERY FOR AGRICULTURE AND FORESTRY — TECHNICAL MEANS FOR ENSURING SAFETY

PART 2 TRACTORS

(First Revision)

1 SCOPE

This standard (Part 2) covers constructional and operational requirements for improving the degree of personal safety of operator of the agricultural tractor.

2 REFERENCES

The following Indian Standards contain provisions which through reference in this text, constitute provision of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated:

<i>IS No.</i>	<i>Title</i>
4468 (Part 1) : 1997	Agricultural wheeled tractors — Rear-mounted three point linkage: Part 1 Categories 1, 2 and 3 (<i>third revision</i>)
6283	Tractors and machinery for agriculture and forestry, powered lawn and garden equipment — Symbols for operator controls and other displays:
(Part 1) : 1998	Common symbols (<i>first revision</i>)
(Part 2) : 1998	Symbols for agricultural tractors and machinery (<i>first revision</i>)
8132 : 1999	Tractors and machinery for agriculture and forestry — Operators manual — Content and presentation
8133 : 1983	Guideline for location and operation of operators controls on agricultural tractors and machinery (<i>first revision</i>)
9939 : 1981	Glossary of terms relating to agricultural tractors and power tillers
10703 : 1992	Agricultural tractors — Maximum activating force required to operate control (<i>first revision</i>)
11113 : 1993	Earth moving machinery — Seat index point (<i>first revision</i>)

<i>IS No.</i>	<i>Title</i>
12061 : 1994	Agricultural tractors — Braking performance — Method of test (<i>first revision</i>)
12207 : 1999	Agricultural tractors — Recommendations on selected performance characteristics (<i>first revision</i>)
12224 : 1987	Method of test for hydraulic power and lifting capacity of agricultural tractors
12239 (Part 1) : 1996	Tractors and machinery for agriculture and forestry — Technical means for ensuring safety — Part 1 : General
12343 : 1998	Agricultural tractors — Operators seat — Technical requirements (<i>first revision</i>)
14683 : 1999	Agricultural tractors and machinery — Lighting devices for travel on public roads

3 DEFINITION

For the purpose of this standard in addition to the following definitions given in IS 9939 shall apply.

3.1 Access Door (Doorway)

Means of entry to and exit from the workplace or cab.

3.2 Emergency Exit

Means of exit which is capable of being opened from the inside of the cab. It may be a normal access door.

3.3 Narrow Track Tractor

A narrow track tractor is an agricultural tractor with a smallest adjustable track range equal to or less than 1 150 mm.

4 REQUIREMENTS

4.1 Three-Point Linkages

The hazards of coupling implements with three point linkages can be reduced by the use of semi-automatic implement couplers (quick coupling devices).

4.1.1 Three-Point Linkage at Rear

4.1.1.1 Forward of a plane passing through the median plane of the pivot points of the lifting rods in a three point coupling system, a minimum safety margin of 25 mm shall be maintained between the moving parts at each point of the lifting device's travel. This does not however apply for the extreme upper and lower range of travel $0.1 n$ which are defined in (a) below and illustrated in Fig. 1. A minimum clearance of 25 mm or a minimum angle of $30^\circ C$ shall be maintained between parts in shear where the angle can change (see Fig. 2).

- a) For the total movement range, n , the lower position A of the lower hitch point is limited by the dimension in definition 3.3.14 and [14] in Fig. 2 of IS 4468 (Part 1) while the upper position B is limited by the maximum hydraulic travel. Travel n' corresponds to travel n reduced upwards and downwards by $0.1 n$ and constitutes the vertical distance between A' and B' .
- b) Within the distance of travel, a minimum safety margin of 25 mm in relation to the adjacent parts shall be maintained around the profile of the lifting rods.

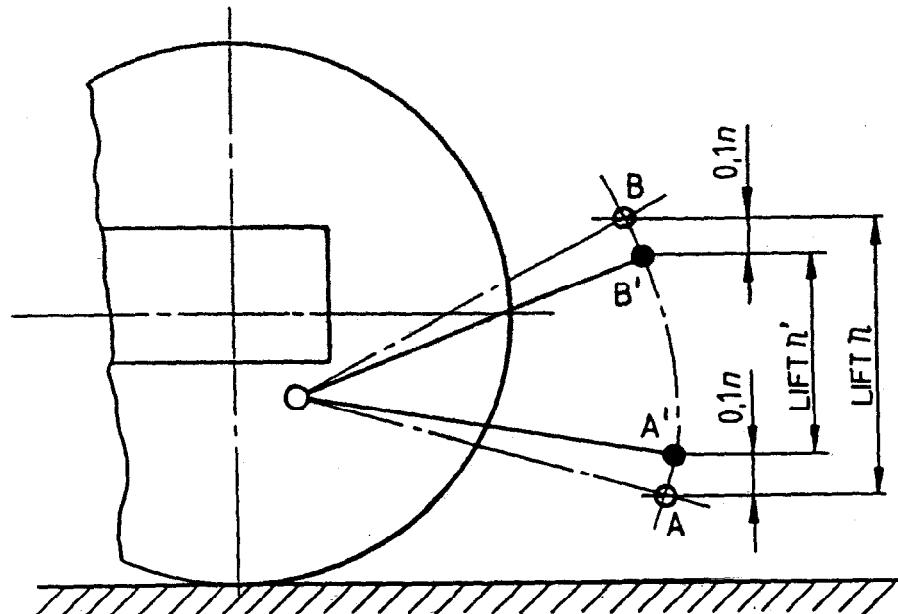


FIG. 1 LIFT RANGE

4.1.2 Controls

4.1.2.1 Main controls

The main controls and their linkage shall be arranged or protected in such a way that the operator cannot reach them if he is standing on the ground between the tractor and the mounted implement.

4.1.2.2 External controls

When additional external controls are fitted, they shall be arranged in such way that the operator can actuate them from a safe position, for instance where the three point hydraulic lift controls or the additional controls for the lifting mechanism are located outside the vertical planes formed by the internal walls of the mudguards.

In addition, the three point hydraulic lifting mechanism shall be actuated by means of controls which either restrict the amount of movement to a maximum of 100 mm each time the control is actuated, the measurement points in this case are formed by the coupling points on the lower arms of the three point coupling; or operate on the operator presence and continual activation principle (dead man's control).

4.1.2.3 Main controls on narrow-track tractors

The controls on narrow track tractors are arranged in front of the transverse vertical plane through the seat index point (SIP) as defined in IS 11113.

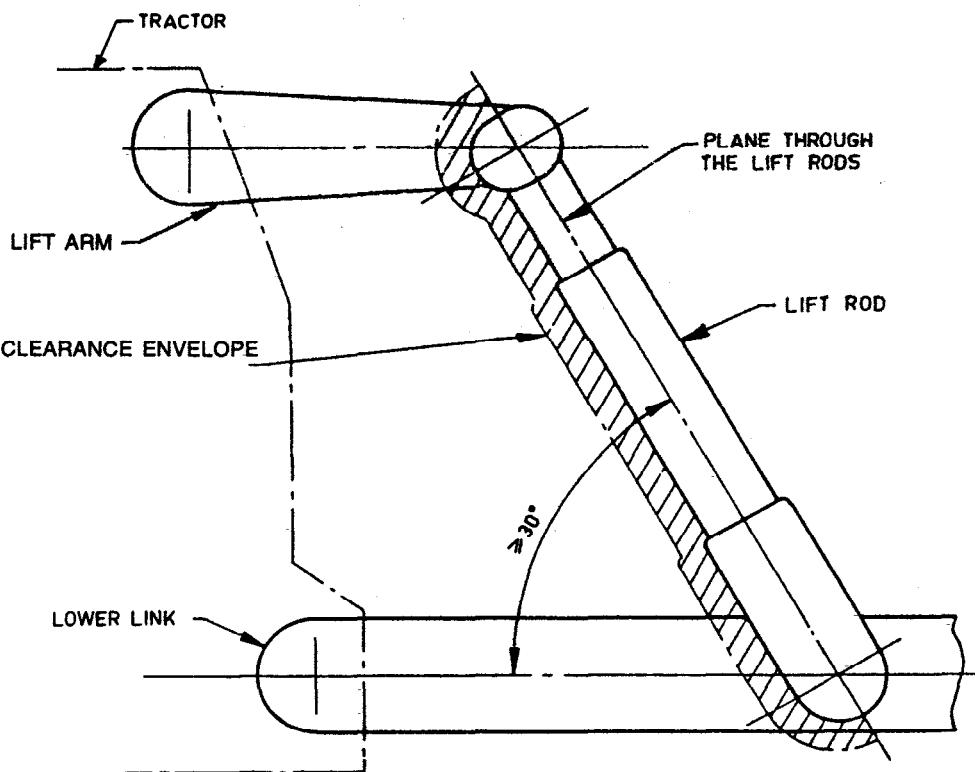


FIG. 2 THREE-POINT LINKAGE

4.1.2.4 Other arrangements

Other arrangements are permitted if the manufacturer provides evidence that they have an effect at least equivalent to the requirements set out in 4.1.2.1 to 4.1.2.3.

4.1.2.5 All controls shall be identifiable. If symbols are used for controls, they shall be in accordance with IS 6283 (Part 1 and 2).

4.1.2.6 Location and movement of operator shall be in accordance with Table 1 of IS 8133.

4.1.2.7 It should be possible to activate the controls with reasonable force, where appropriate, in accordance with IS 10703.

4.1.2.8 Hand controls should be of a shape and size permit an adequate grasp and hand clearance. The clearance around these controls shall be not less than 70 mm.

4.1.2.9 The pedals shall be in position where all free play is removed. The steering wheel shall be adjusted to its mid position. The pedals shall be placed in the following order from the left hand side to the right hand side :

a) Clutch (operated by left foot), and

b) Brake(s) (operated by right foot).

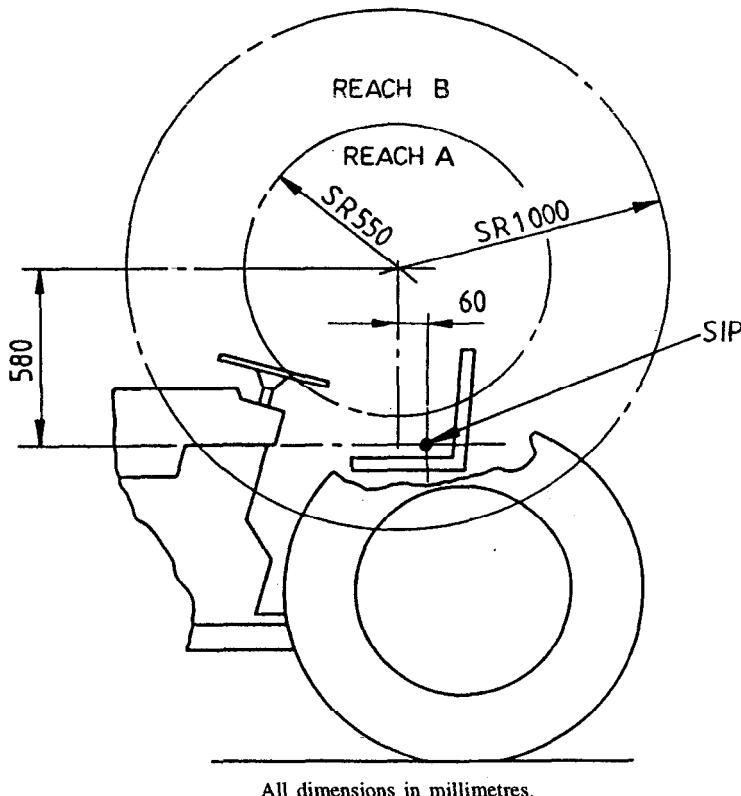
4.1.2.9.1 The accelerator pedal, if installed should normally be operated by right foot.

4.2 OPERATOR'S WORKPLACE

4.2.1 When seated, no shearing or pinching points are permitted within reach of the operator's hands (Reach *B* in Fig. 3) or feet. For tractors designed for special applications the requirements in IS 12239 (Part 1) may not apply. In these cases the requirements in 4.2.2 shall apply.

4.2.2 The reach of the operator is divided into spherical volumes *A* and *B* (shown as Reaches *A* and *B* respectively in Fig. 3). The spherical centre-point of the volumes is located 60 mm in front and 580 mm above the seat index point (SIP) (see Fig. 3). Volume *A* is formed by a spherical radius of 550 mm, volume *B* is the volume between this radius and a spherical radius of 1 000 mm.

Within volume *A*, a minimum clearance of 120 mm between power and inertia-operated, and other adjacent parts shall be maintained. Within volume *B*, a minimum clearance of 25 mm shall be maintained. Within both volumes, a minimum angle



All dimensions in millimetres.

FIG. 3 OPERATOR'S REACH

of 30° shall be maintained where parts shear against each other.

In the case of narrow-track tractors, these requirements do not apply to any points behind a plane which is located at an angle of 45° to the rear and which runs transverse to the travel direction through a point located 230 mm behind the SIP (see Fig. 4). Warning decals shall indicate hazards, if any.

4.3 Access to Operator's Seat and Optional Passenger's Seat

4.3.1 Access Doorway(s)

The minimum dimensions of the access doorway aperture, both for the frame and with the door open shall be as shown in Fig. 5 and 6.

4.3.2 Emergency Exits

4.3.2.1 Number and location

There shall be a minimum of three emergency exits, each of which shall be on a different side of the cab : the front, rear and roof of the cab may be considered as sides for this purpose.

4.3.2.2 Dimensions

The cross sectional dimensions of emergency exits shall be large enough to enclose an ellipse with principal axes of 640 mm and 440 mm.

4.3.3 Internal Clearance Dimensions

4.3.3.1 The minimum clearance dimensions inside the cab shall be as shown in Fig. 7 and Table 1 and Table 2.

These dimensions are defined in relation to the vertical reference plane, generally longitudinal to the tractor and passing through the seat index point and the steering wheel centre.

NOTE — The dimensions are basically valid for cabs with only one driving seat.

4.3.4 The seat index point (SIP) shall be determined according to IS 11113.

4.3.5 The distances from the seat index point to the pedals and the steering wheel shall be in accordance with IS 12343.

The exhaust outlet shall be positioned so that exhaust fumes pass above or behind the driver (see 6.6 of IS 12343).

4.3.6 Access should minimize the probability of the operator being inadvertently restrained; that is

Table 1 Minimum Internal Clearance Dimensions
(Clause 4.3.3.1)

Distance	Dimension, Min (mm)
Distance from the seat index point to any part of the cab ceiling surface, above, forward of and to either side of the operator's head ¹⁾	960
Distance from the seat index point to the cab back wall at a height between 210 mm above the seat index point and the line roof contour defined by the 960 mm radius plus the 150 mm blend radius ²⁾	365
Lateral clearance at any distance between 310 mm above the seat index point and the roof contour defined by the 960 mm radius plus the 45° line, perpendicular to the vertical reference plane for a distance of 235 mm ² rearward from the seat index point	450
Distance from the outer side of the steering wheel rim to the cab surface or other hand controls ³⁾	80

¹⁾Soft materials such as padding may penetrate into the free space up to a maximum of 50 mm.

²⁾If the horizontal seat adjustment provide exceeds \pm 75 mm from the mid-position, then any dimensions forward from the seat index point shall be reduced, and dimensions to the rear from the seat index point increased, on the basis :

[Total adjustment to the rear of the seat mid position minus 75 mm]

³⁾Excluding hand controls mounted on the steering column.

Table 2 Clearance Dimensions Around the Controls
(Clause 4.3.3.1)

Type of Control	Dimension ¹⁾ , Min (mm)
For engine controls and controls which require an operating force of more than 150 N	50
For controls, other than engine controls, which require an operating force of 80 N to 150 N	25

¹⁾These minimum distances shall be valid for all control positions

catching or holding of the person or clothes should be avoided.

If any parts protrude from the standing area (for example clutch pedal), provisions shall be made to enable one foot to be placed either in front of, rearward or at the side of such parts.

These requirements also apply where an optional passenger seat is provided (see Fig. 8). In addition, where a passenger seat is fitted and where parts could constitute a danger to the feet, provision shall be made for protective devices within a hemispherical radius of 800 mm starting from the forward edge of the seat cushion and pointing downwards. Dangerous parts in reaches A and B shall be protected within a sphere centred 670 mm above the centre of the passenger seat front edge.

4.3.7 For narrow-track tractor, the exhaust system, whether vertical or horizontal, shall be positioned

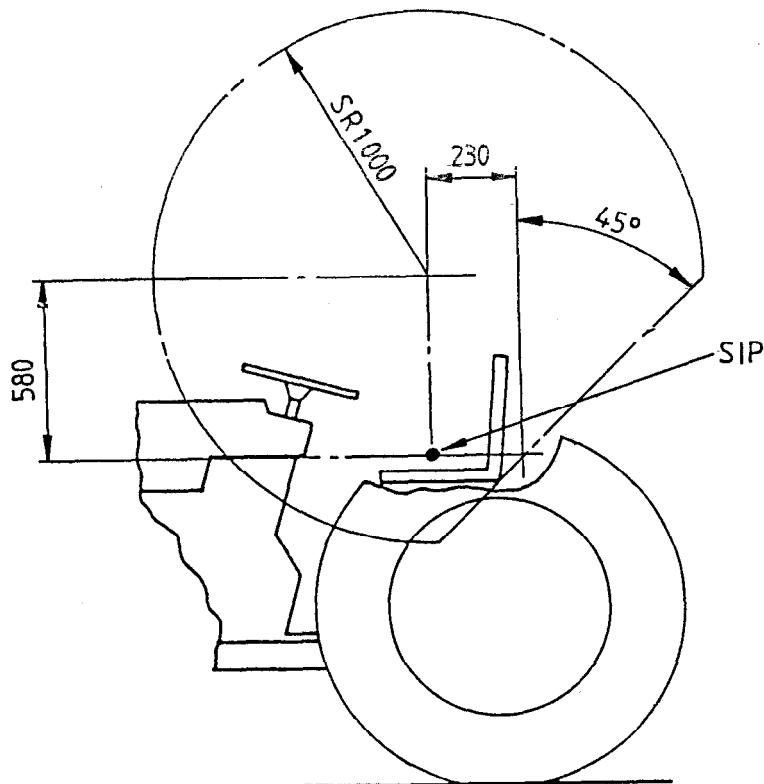
so that its hot parts cannot be touched by the driver whilst gaining access to the tractor seat or sitting at the controls.

4.4 Guards

Guards [See 5 and 6 of IS 12239 (Part 1)] shall be provided wherever necessary, particularly on following points.

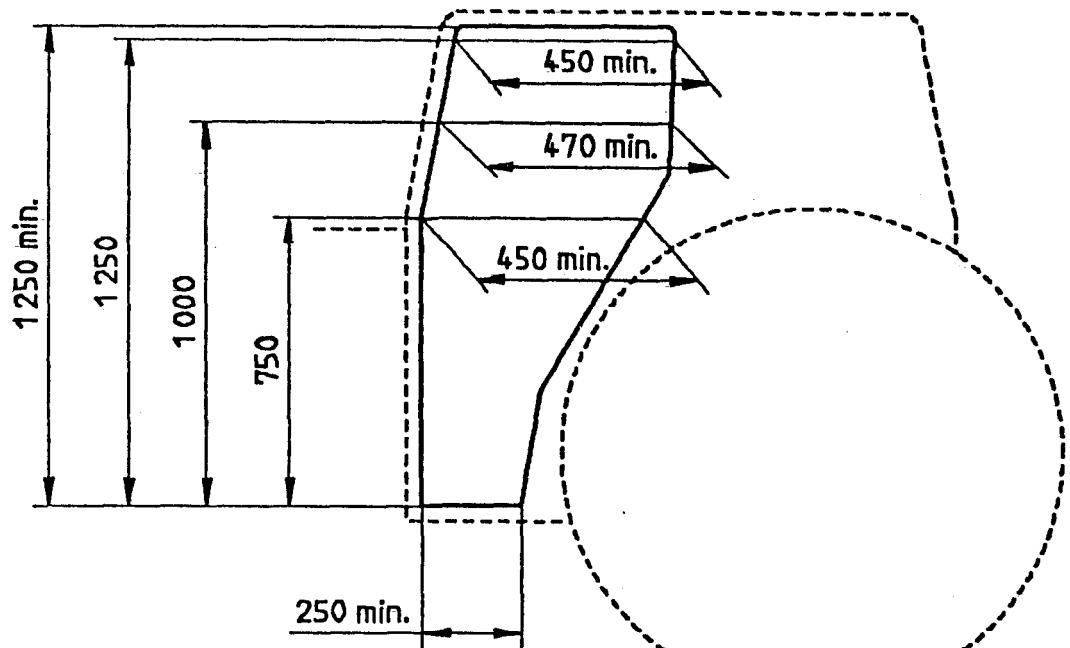
4.4.1 Hot Parts

A guard or shield shall be fitted to reduce to a minimum, the possibility of inadvertent contact during normal operations with any exposed hot element that may cause harm when the operator is seated in the normal operating position. The guard should be constructed of heat-insulating material, or positioned and mounted in such a manner that it will not itself become hot.



All dimensions in millimetres.

FIG. 4 LIMITATION TO OPERATOR'S REACH VOLUMES FOR NARROW-TRACK TRACTORS



All dimensions in millimetres.

NOTE—For tractors where the seat can be reached straight from the footstep, the height at which the widths are measured may be decreased.

FIG. 5 ACCESS DOORWAY DIMENSIONS

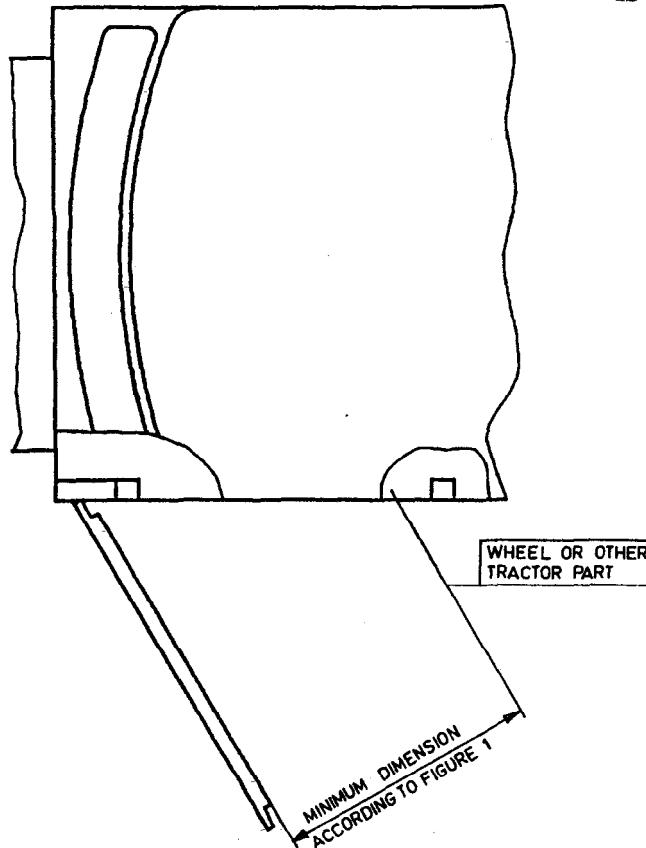


FIG. 6 EXAMPLES OF LIMITATION OF DIMENSIONS WITH DOOR OPEN

4.4.2 Rear Wheels or Tracks

All tractors shall be provided with rear wheel or full track guards (mud guards) which should be higher than the circumference of the wheels or track and so far ahead that the operator's or passenger's feet cannot come into contact with the wheels or track. The wheel guard may be omitted when the wheels are already protected by other means, such as, auxiliary equipment.

4.4.3 Fans

All propeller or axial fans which are exposed and within the reach of the ground, the operator's position or the passenger's position shall be guarded against contact.

4.4.4 Pulleys and Belts

Tractor belt pulleys shall be so located or guarded that while in operation if the belt breaks or slips off, it should not strike the operator and there is no risk of contact with the nip point. Open gears, belts and chain drives, and idlers shall have nip points protected by guards or by other parts of the equipment. Chain drives as well as belts that are joined in such a manner as to prevent protrusions, shall be guarded over their entire length if there would be a possibility of contact with them.

4.4.5 Other Points

Other dangerous points shall also be guarded by adequate guards or so located that they are safe enough.

5 LIGHTING

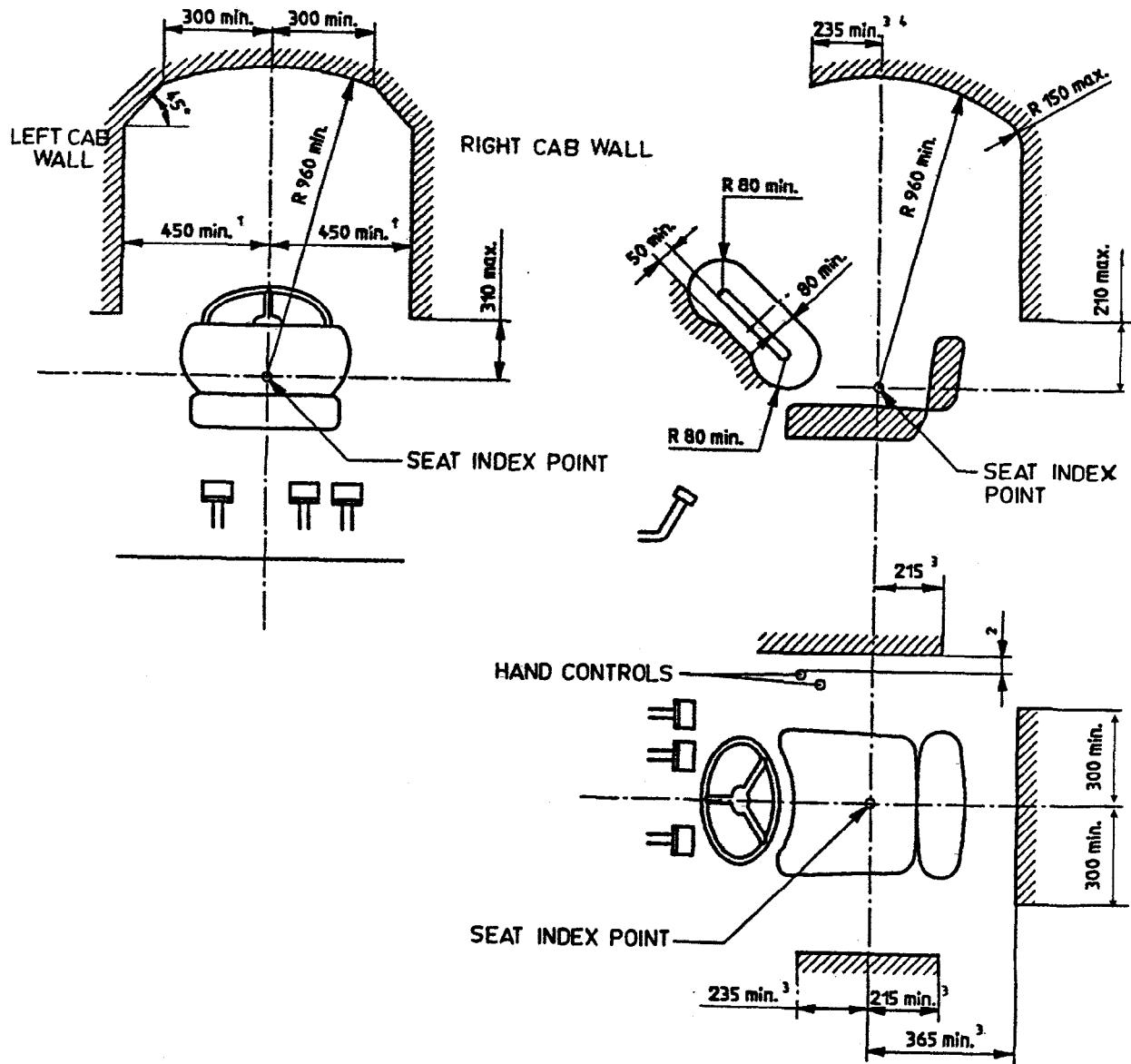
For safe operation in night and on highway lighting provisions shall be made according to IS 14683.

6 BRAKE PERFORMANCE

When tested in accordance with 4 of IS 12061 each tractor shall meet the requirement given in 3.5 of IS 12207.

7 SLOW MOVING VEHICLE EMBLEM

One SMV (Slow Moving Vehicle) identification emblem as shown in Fig. 9 consisting of a fluorescent orange equilateral triangle with a red retro-reflector border positioned with a point of triangle up shall be provided on the rear side of the vehicle. The red retro-reflector border defines the shape of the fluorescent colour in daylight and appears as a hollow red triangle with path of motor vehicle headlight in the night. The emblem shall be mounted in a plane perpendicular to the direction of travel and shall be visible from the rear of SMV. It shall be located 0.6 m to 1.8 m above the ground



¹ Valid for tractors with only one operator position.

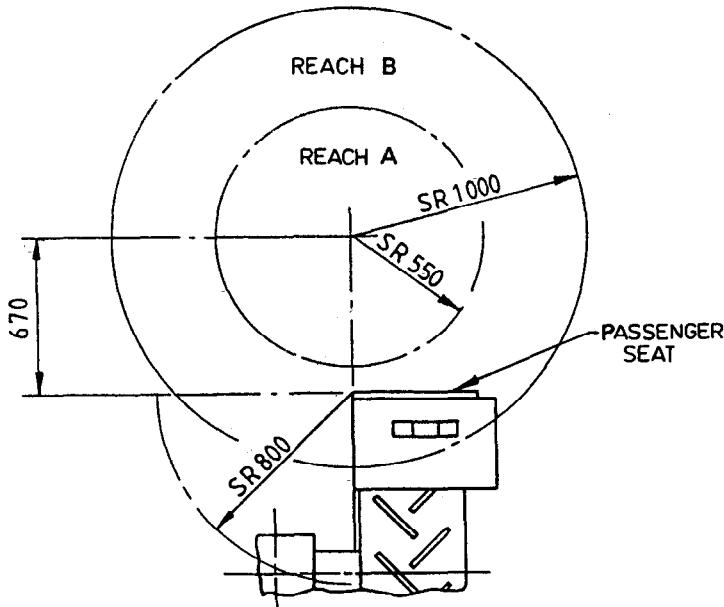
² See Table 2.

³ If the horizontal seat adjustment provided exceeds ± 75 mm from the mid-position, then any dimensions forward from the seat index point shall be reduced, and dimensions to the rear from the seat index point increased, on the basis:
 [Total adjustment to the rear of the seat mid-position minus 75 mm]

⁴ The clearance zone, as defined in this region by the 960 mm radius, may be reduced for cabs where limiting overall tractor maximum dimensions are of prime design importance and/or for accommodating specific roof-mounted equipment.

All dimensions in millimetres.

FIG. 7 MINIMUM INTERNAL CLEARANCE DIMENSIONS



All dimensions in millimetres.

FIG. 8 PART OF TRACTOR END VIEW SHOWING REACH VOLUMES IN RELATION TO PASSENGER SEAT

measured from the lower side of the emblem. If the structure of the vehicle makes it impossible to maintain the dimensions of the SMV emblem as given in Fig. 9, it may be suitably modified provided that each side is not less than 200 mm.

8 OTHER REQUIREMENTS

8.1 When tested in accordance with 5.1 of IS 12224 the drop in the height of the point of specification of force after each 5 minutes interval for a total duration of half-an-hour shall meet the requirement given in 3.4 (b) of IS 12207. However, implement shall not suddenly drop to the ground during the test under any circumstance.

8.2 Spark arresters shall be provided in the exhaust system of the engine of each tractor.

8.3 Provision for locking the agricultural trailer shall be provided at the hitch point.

8.4 Differential lock shall be provided in the tractor.

8.5 Safety device against accidental start of engine shall be provided in the tractor.

9 ACCESS FOR SERVICING AND FLUID LEVEL CHECKS

Appropriate access steps and handholds shall be provided for routine servicing and fluid level checks.

10 OPERATOR'S MANUAL

The operator's manual shall meet the requirements of IS 8132. It shall also include mention of the safety aspects of the tractor together with information on any special requirements to ensure its safe operation.

The operator's manual should also cover the fitting and use of additional accessories and/or optional extras and their routine maintenance.

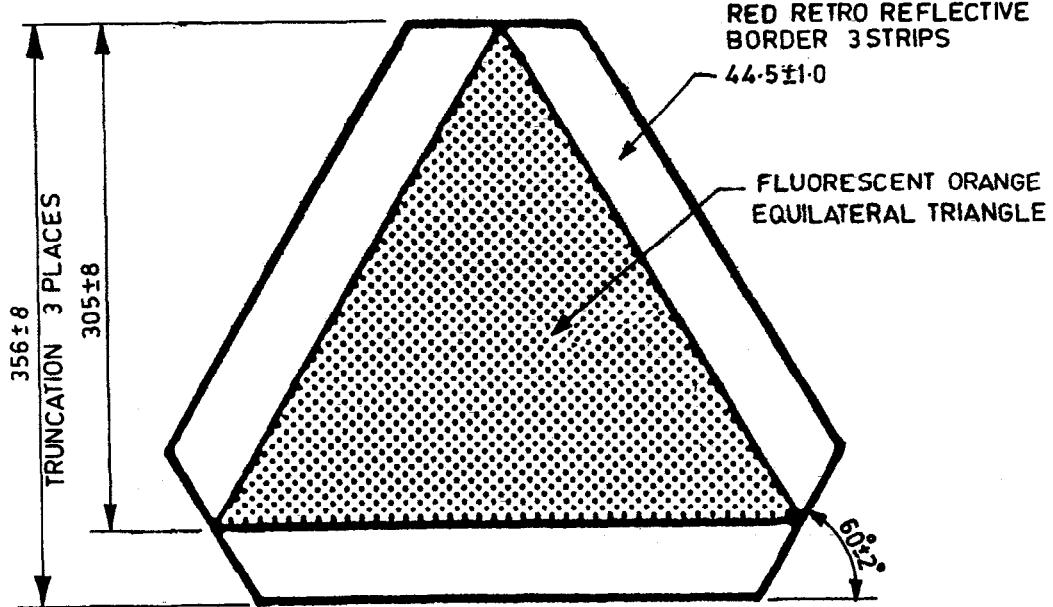
11 MARKING

11.1 Each tractor shall be marked with the following information on a metallic plate rigidly attached at prominent place on the tractor:

- Manufacturer's name and trade-mark, if any;
- Model, code and serial number;
- Power take-off power, kW; and
- Specific fuel consumption.

11.2 A minimum cautionary notice worded as under shall be written in *vernacular* language legibly and prominently on a label fixed on the tractor:

- DO NOT MAKE ADJUSTMENTS WHEN TRACTOR IS IN OPERATION;
- DO NOT USE INTOXICANTS LIKE LIQUOR, OPIUM, ETC, WHILE OPERATING;
- DO NOT PUT OR TAKE OFF BELT WHILE PULLEY IS RUNNING;



NOTE — Emblem must be mounted with the point upward.

FIG. 9 SLOW-MOVING VEHICLE IDENTIFICATION EMBLEM

- d) DO NOT SIT OR STAND OR SIT IN AN UNSAFE PLACE SUCH AS ROOF, DRAWBAR, MUDGUARD, RUNNING BOARD OR LOAD WHEN THE TRACTOR IS MOVING;
- e) NO PERSON SHOULD MOUNT OR DISMOUNT FROM A TRACTOR WHILE IT IS IN MOTION EXCEPT IN AN EMERGENCY;
- f) THE OPERATORS OF TRACTOR SHOULD:
 - 1) BE ADEQUATELY TRAINED AND, WHEN REQUIRED, PROPERLY LICENSED;
 - 2) OBTAIN AND READ THE OPERATING MANUAL BEFORE USING A TRACTOR FOR THE FIRST TIME;
 - 3) WEAR ADEQUATE AND WELL-FITTING FOOTWEAR;
 - 4) WEAR SNUG-FITTING CLOTHING;
 - 5) KEEP HANDS, FEET AND CLOTHING AWAY FROM ALL MOVING PARTS;
 - 6) PUT THE GEAR SELECTOR, POWER OPERATED ATTACHMENTS AND POWER TAKE-OFF TO NEUTRAL AND LOWER THE ATTACHED EQUIPMENT TO THE GROUND BEFORE LEAVING THE STOPPED TRACTOR;
- 7) LOCK THE BRAKE PEDALS TOGETHER WHEN TRAVELLING ON PUBLIC ROADS; AND
- 8) STOP AT ALL UNGUARDED RAILWAY CROSSINGS AND MAKE SURE THAT NO TRAINS ARE COMING.

11.3 BIS Certification Marking

Each tractor may also be marked with Standard Mark for safety.

11.3.1 The use of the Standard Mark is governed by the provisions of *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

ANNEX A
(Foreword)
INFORMATION ON SAFE OPERATION OF TRACTORS

A-1 GENERAL**A-1.1 Operator**

All operators of tractors should:

- a) be in good health, sound mind and be not under the influence of any sort of intoxicants;
- b) be adequately trained and, when required, properly licensed;
- c) obtain and read the operating manual before using a tractor for the first time;
- d) wear adequate and well-fitting footwear;
- e) wear snug-fitting clothing; and
- f) keep hands, feet and clothing away from all moving parts.

A-1.2 Starting of Tractor

Before starting a tractor, the operator should:

- a) clear all material from the operator's work place and mud from the pedals;
- b) inspect the tractor to make certain that it is properly adjusted and is in good working condition;
- c) lubricate working parts, tighten all loose parts and secure safety shields in place;
- d) check engine oil level and water in radiator (in case of water cooled engines); and
- e) place all the controls in neutral.

A-1.3 Operating Conditions

- a) Tractors should not be started or operated in buildings unless conditions are such that there is no risk of fire or contamination of the air.
- b) All shields for power take-offs, including the tractor master shield and the power take-off shaft shield, should be in place during use.
- c) When power take-off is not in use, the stub shaft should be provided with a shield.
- d) Except in an emergency, no person should mount or dismount from a tractor while it is in motion.
- e) All clutches should be engaged gradually, particularly when starting to move heavy loads.

A-2 TRAVELLING**A-2.1 General**

A-2.1.1 When a safety frame or cab is provided, the operator should use a seat belt. It is strongly recommended that no seat belt be used if a safety frame or cab is not provided.

A-2.1.2 Adjustable wheels should, whenever necessary, be spread as far as practicable, considering the work to be done, to reduce tipping hazards.

A-2.1.3 Tractors should not be driven faster than is safe, having regard to prevailing conditions.

A-2.1.4 While a tractor is moving, no person should:

- a) stand or sit in an unsafe place such as roof, drawbar, mudguard, running board or load;
- b) climb from one tractor or trailer to another;
- c) jump on or off except in emergencies;
- d) apply wheel chokes; and
- e) leave arms, legs or any object protruding outside.

A-2.1.5 The operator should check brake adjustment at the start of the day, before starting down steep slopes and before entering a public highway.

A-2.1.6 Tractors should be driven with particular care:

- a) over sloping, uneven, soft, slippery or otherwise unsafe ground;
- b) along side ditches or banks;
- c) when turning;
- d) when reversing; and
- e) when driven with any attachment that drastically raises or changes the tractor's centre of gravity.

A-2.1.7 Owing to the possibility of tipping backward, particular care should be taken in driving when:

- a) transporting heavy loads up a slope;
- b) using rear wheel weights or ballast in rear tyres;

- c) using rear-mounted equipment;
- d) raising the position of the hitch point on towed loads;
- e) the rear wheels dig into soft ground;
- f) using forward gear if the wheels are frozen to the ground; and
- g) attempting to drive forward if the rear wheels are in a ditch or hole.

A-2.1.8 If necessary to prevent rearing, the front of the tractor should be weighted.

A-2.2 Travelling on Public Roads

A-2.2.1 When travelling on public roads, the operator should:

- a) lock the brake pedals together;
- b) comply with all traffic laws and regulations;
- c) stop at all unguarded railway crossings and make sure that no trains are coming;
- d) signal intention to turn, slow down or stop;
- e) keep on the correct side of the road and, when it is safe to do so, pull off the highway to allow faster traffic to pass;
- g) shift to a lower gear for control when going downhill;
- h) shift to a lower gear to avoid stalling when going uphill; and
- j) reduce speed when the roads are slippery.

A-2.2.2 The moving of tractors should be planned in such a way that:

- a) moves are made during daylight hours; and
- b) moves are not made during periods of heavy traffic.

A-2.2.3 When moves are made during the night or other periods of reduced visibility, all lights and reflectors should be used as required by law, and they should be kept in good working condition and clean.

A-2.2.4 Rear-view mirror should be properly adjusted.

A-2.2.5 In case of travel during rain and hot sun when a cab is not provided, provision should be made to mount a canopy above the driver's seat.

A-3 REVERSING AND TURNING

A-3.1 Speed should be reduced, using the tractor throttle as much as possible, before marking any turns.

A-3.2 Before turning or reversing, the tractor operator should make it certain that there are no workers or obstacles in the path of travel.

A-3.3 When a tractor is mired in mud or stuck in a ditch, the operator should always attempt to drive out in reverse gear only. If this attempt is unsuccessful, he may secure logs or planks behind the rear wheels, to increase traction, and again attempt to drive out using reverse gear. Under no condition should logs or planks be secured in front of the rear wheels to increase traction.

A-4 STOPPING

A-4.1 Before leaving a stopped tractor, the operator should:

- a) shift the gear selector to neutral;
- b) re-engage the master clutch, except in the case of torque converter machines;
- c) lock the parking brake;
- d) lower attached equipment to the ground; and
- e) put all power-operated attachments and power take-off into neutral.

A-4.2 The operator should not dismount unless the tractor is stationary and there is an adequate and safe place for him to step onto.

A-4.3 When slowing down or stopping, brakes should be applied equally to the two rear wheels.

A-4.4 Tractors should not haul heavy vehicles or machinery unless they can be stopped in a safe and controlled manner.

A-5 USE OF ATTACHED EQUIPMENT

A-5.1 Towed equipment should be attached only to the drawbar provided on the tractor.

A-5.2 In no case should attachments be secured at the front or rear axle, to the seat bracket or to any other frame member.

A-5.3 When attachments are hitched to the tractor:

- a) the attachment should be blocked with blocks or chokes, if the tractor is backed;
- b) if the attachment is pulled onto the tractor, the attachments, should be kept under control by brakes or chokes; and
- c) no person should remain between the tractor and the attachment, and the drawbar should be handled with a hook or other suitable device.

A-5.4 When attachment and tractor are unhitched, both vehicles should be blocked by brakes or chokes.

A-5.5 All shield should be secured in place after hitching and before the use of any attachment.

A-6 CARRYING OF PASSENGERS OR OBJECTS

A-6.1 Tractors should not carry:

- a) any person for whom there is not a safe seat,
- b) children, or
- c) loose objects unless a safe place is provided for them.

A-7 TOWING AND PUSHING

A-7.1 A tractor should not be used to push other vehicles unless an adequate and securely fastened push bar is fitted to it.

A-7.2 Tractors should not haul loads so heavy as to prevent effective control, specially on any sloping, uneven, soft or otherwise unsafe ground.

A-8 OPERATING ON SLOPING GROUND

A-8.1 When starting up a slope, the operator should choose a power gear to avoid stalling or shifting of gears on the slope and should engage the clutch slowly to avoid upsetting backwards.

A-8.2 Adjustable wheels should be spread as far as possible for the job at hand.

A-8.3 The gear lever should not be put in neutral and clutch pedal should not be disengaged when descending slopes. A low gear should be selected to assist in braking the tractor.

A-8.4 If necessary to prevent rearing, the front of the tractor should be weighted when ascending a slope, or the tractor should preferably be backed up to the top.

A-8.5 Unbraked towed equipment should not be taken down steep slopes without extreme caution.

A-9 STATIONARY WORK

A-9.1 When using the tractor as a source of power for stationary power take-off or belt work,

- a) all shields and guards should be in place before the power is applied,

b) the tractor frame should be earthed to remove static electricity, and

- c) while threshing, spark arrestor should be used on the exhaust pipe.

A-9.2 When tractors are used for stationary work inside a building, adequate means of removing exhaust gases and supplying fresh air should be provided.

A-9.3 When a tractor with a winch is used for pulling, the tractor should be properly aligned in the direction of the pull.

A-10 TRACTOR FUELLING

A-10.1 When the fuel tanks of internal combustion engines are being filled:

- a) the engines should not be running, and
- b) no open flame devices, open lights, lighted cigarettes or the like should be allowed.

A-10.2 Hot engines should be allowed to cool down before refuelling. Normally, the fuel tank should be refilled in the evening after the day's work.

A-10.3 After fuelling, some time should be allowed for fuel vapours to disappear before the engine is re-started.

A-10.4 Contact should at all times be maintained between the metal outlet of the refuelling hose or the can spout, on the one hand, and the fuel tank opening on the tractor on the other, or other means of bonding should be ensured to minimize the possibility of an explosion or outbreak of fire due to the discharge of an accumulation of static electricity.

A-10.5 The tractor fuel system should be checked frequently to detect fuel leaks. To be checked in particular are the fuel tank seams, fuel lines, fuel filler caps, fuel line shut-off valves, chokes and all fuel line connections.

A-10.6 Fire extinguishers should be provided on the tractor, at the refuelling point and in the building where the tractor is stored.

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BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones: 323 01 31, 323 33 75, 323 94 02

Telegrams: Manaksantha
(Common to all offices)

Regional Offices:

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